

CLAIMS

What is claimed is:

- 1 1. An isolated DNA molecule comprising a nucleotide sequence
2 that encodes lysine 2,3-aminomutase.
- 1 2. The isolated DNA molecule of claim 1, wherein the lysine 2,3-
2 aminomutase is a clostridial lysine 2,3-aminomutase.
- 1 3. The isolated DNA molecule of claim 2, wherein the lysine 2,3-
2 aminomutase has the amino acid sequence of SEQ ID NO:2.
- 1 4. The isolated DNA molecule of claim 3, wherein the nucleotide
2 sequence that encodes the lysine 2,3-aminomutase is SEQ ID NO:1.
- 1 5. The isolated DNA molecule of claim 1, wherein the lysine 2,3-
2 aminomutase is an *Escherichia coli* lysine 2,3-aminomutase.
- 1 6. The isolated DNA molecule of claim 5, wherein the lysine 2,3-
2 aminomutase has the amino acid sequence of SEQ ID NO:4.
- 1 7. The isolated DNA molecule of claim 6, wherein the nucleotide
2 sequence that encodes the lysine 2,3-aminomutase is SEQ ID NO:3.
- 1 8. The isolated DNA molecule of claim 1, wherein the lysine 2,3-
2 aminomutase is an *Haemophilus influenza* lysine 2,3-aminomutase.
- 1 9. The isolated DNA molecule of claim 8, wherein the lysine 2,3-
2 aminomutase has the amino acid sequence of SEQ ID NO:6.
- 1 10. The isolated DNA molecule of claim 9, wherein the nucleotide
2 sequence that encodes the lysine 2,3-aminomutase is SEQ ID NO:5.
- 1 11. The isolated DNA molecule of claim 1, wherein the lysine 2,3-
2 aminomutase is an *Porphyromonas gingivalis* lysine 2,3-aminomutase.
- 1 12. The isolated DNA molecule of claim 11, wherein the lysine 2,3-
2 aminomutase has the amino acid sequence of SEQ ID NO:8.

1 13. The isolated DNA molecule of claim 12, wherein the nucleotide
2 sequence that encodes the lysine 2,3-aminomutase is SEQ ID NO:7.

1 14. The isolated DNA molecule of claim 1, wherein the lysine 2,3-
2 aminomutase is an *Bacillus subtilis* lysine 2,3-aminomutase.

1 15. The isolated DNA molecule of claim 14, wherein the lysine 2,3-
2 aminomutase has the amino acid sequence of SEQ ID NO:10.

1 16. The isolated DNA molecule of claim 15, wherein the nucleotide
2 sequence that encodes the lysine 2,3-aminomutase is SEQ ID NO:9.

1 17. The isolated DNA molecule of claim 1, wherein the lysine 2,3-
2 aminomutase is an *Deinococcus radiodurans* lysine 2,3-aminomutase.

1 18. The isolated DNA molecule of claim 17, wherein the lysine 2,3-
2 aminomutase has the amino acid sequence of SEQ ID NO:12.

1 19. The isolated DNA molecule of claim 18, wherein the nucleotide
2 sequence that encodes the lysine 2,3-aminomutase is SEQ ID NO:11.

1 20. The isolated DNA molecule of claim 1, wherein the lysine 2,3-
2 aminomutase is an *Aquifex aeolicus* lysine 2,3-aminomutase.

1 21. The isolated DNA molecule of claim 20, wherein the lysine 2,3-
2 aminomutase has the amino acid sequence of SEQ ID NO:14.

1 22. The isolated DNA molecule of claim 21, wherein the nucleotide
2 sequence that encodes the lysine 2,3-aminomutase is SEQ ID NO:13.

1 23. The isolated DNA molecule of claim 1, wherein the lysine 2,3-
2 aminomutase is an *Treponema pallidum* lysine 2,3-aminomutase.

1 24. The isolated DNA molecule of claim 23, wherein the lysine 2,3-
2 aminomutase has the amino acid sequence of SEQ ID NO:16.

1 25. The isolated DNA molecule of claim 24, wherein the nucleotide
2 sequence that encodes the lysine 2,3-aminomutase is SEQ ID NO:15.

1 26. An expression vector comprising the isolated DNA molecule of
2 claim 1.

1 27. A cultured host cell comprising the expression vector of claim
2 26.

1 28. A cultured host cell of claim 27 wherein the host cell is *E. coli*.

2

1 29. A method of producing L- β -lysine, comprising the steps of:

2 (a) culturing a host cell of claim 27 in the presence of L-lysine,

3 wherein the cultured host cell expresses the lysine 2,3-aminomutase, and

4 (b) isolating L- β -lysine from the cultured host cells.

1 30. A method of producing L- β -lysine, comprising the steps of:

2 (a) incubating L-lysine in a solution containing purified lysine 2,3-

3 aminomutase, and

4 (b) isolating L- β -lysine from the incubation solution.

1 31. The method of claim 30, wherein the lysine 2,3-aminomutase

2 has an amino acid sequence selected from the group consisting of (i) SEQ ID NO:4,

3 (ii) SEQ ID NO:6, (iii) SEQ ID NO:8, (iv) SEQ ID NO:10, (v) SEQ ID NO:12, (vi)

4 SEQ ID NO:14, and (vii) SEQ ID NO:16, and (viii) a conservative amino acid variant

5 of any of SEQ ID NOs:2, 4, 6, 8, 10, 12, 14, or 16.

1 32. The method of claim 31, wherein step (b) further comprises

2 isolating L- β -lysine from L-lysine via chromatography.

1 33. A method of producing lysine 2,3-aminomutase, comprising the
2 steps of:

3 (a) culturing a host cell of claim 27, wherein the cultured host cell
4 expresses the lysine 2,3-aminomutase, and

5 (b) isolating lysine 2,3-aminomutase from the cultured host cells.

1 34. The method of claim 33, wherein the isolated lysine 2,3-
2 aminomutase has an amino acid sequence selected from the group consisting of (i) SEQ
3 ID NO:2, (ii) SEQ ID NO:4, (iii) SEQ ID NO:6, (iv) SEQ ID NO:8, (v) SEQ ID
4 NO:10, (vi) SEQ ID NO:12, (vii) SEQ ID NO:14, and (viii) SEQ ID NO:16, and (ix)
5 a conservative amino acid variant of any of SEQ ID NOs:2, 4, 6, 8, 10, 12, 14, or 16.

1 35. A purified preparation of L- β -lysine.